GOALI:Nanoscale Characterization and Development of Ultra Low-k Dielectric Xerogel Films

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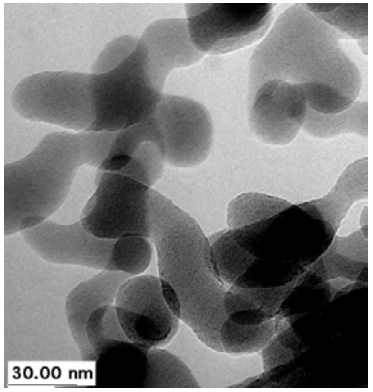
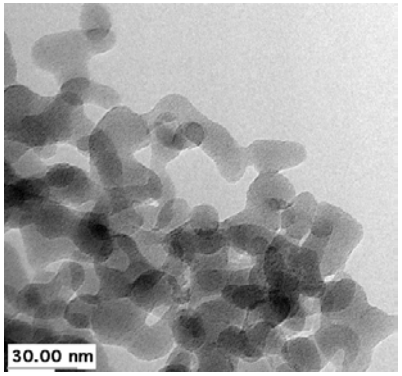
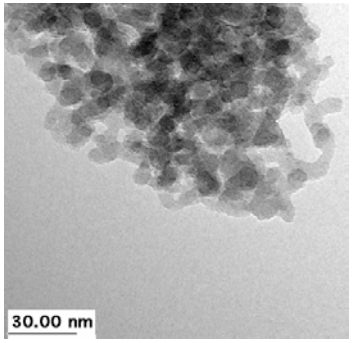
To meet demands for faster, smarter, and smaller electronic devices, the semiconductor industry must continue to shrink features in integrated circuits. As metal connections within microcircuits become thinner and closer together, better insulators must be developed. Improving insulating capabilities requires the incorporation of pores into these materials, consequently, weakening the films. This work focuses on understanding the properties of these porous materials and on developing methods of enhancing their strength to withstand assembly and everyday use.







These electron microscopy images of the same type of insulator film illustrates our ability to control structure and, consequently, to impart desired properties to these materials.

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Education:

One undergraduate (Janet Trammell) and four graduate students (Rosa Orozco-Teran, Zhengping Zhang, Pawan Nerusu, Dongkyu Cha) have contributed to this work. Orozco-Teran and Zhang will complete their PhD's in 2004. Students regularly meet and discuss relevant project issues with our Texas Instruments liaison maintaining awareness of industrial priorities. In Spring and Summer 2004, three students from the Texas Academy of Mathematics and Science (TAMS), will be working on this effort.

Outreach:

In addition to TAMS involvement, plans are underway to conduct demonstrations at a local high school and at a local elementary program. The investigators have given several interviews for articles in the Dallas-Fort Worth media discussing the importance of semiconductor challenges and advancements in nanotechnology.